

πληροφορικη και νεεσ τεχνολογιεσ στην εκπαιδευση

Εργασία 1



24 Μαρτίου 2018

παιδαγωγικη σχολη φλωρινασ

ΤΜΗΜΑ ΔΗΜΟΤΙΚΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

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# 1 Human Ecology

## 1.1 Economy of nature

The roots of ecology as a broader discipline can be traced to the Greeks and a lengthy list of developments in natural history science. Ecology also has notably developed in other cultures. classic knowledge, as it is called, includes the human propensity for perceptive knowledge, clever relations, understanding, and for passing on information about the real world and the human experience. The term ecology was coined by Ernst Haeckel in 1866 and defined by direct reference to the economy of nature.

Like other contemporary researchers of his time, Haeckel adopted his terminology from Carl Linnaeus where human ecological connections were more evident. In his 1749 publication, Specimen academicum de oeconomia naturae, Linnaeus developed a science that included the economy and polis of nature. Polis stems from its Greek roots for a political community (originally based on the city-states), sharing its roots with the word police in reference to the promotion of growth and maintenance of good social order in a community. Linnaeus was also the first to write about the close affinity between humans and primates. Linnaeus presented early ideas found in modern aspects to human ecology, including the balance of nature while highlighting the importance of ecological functions (ecosystem services or natural capital in modern terms): "In exchange for performing its function satisfactorily, nature provided a species with the necessaries of life". The work of Linnaeus influenced Charles Darwin and other scientists of his time who used Linnaeus' terminology (i.e., the economy and polis of nature) with direct implications on matters of human affairs, ecology, and economics.

## 1.2 Human science

Ecology is not just biological, but a human science as well. An early and influential social scientist in the history of human ecology was Herbert Spencer. Spencer was influenced by and reciprocated his influence onto the works of Charles Darwin. Herbert Spencer coined the phrase "survival of the fittest", he was an early founder of sociology where he developed the idea of society as an organism, and he created an early precedent for the socio-ecological approach that was the subsequent aim and link between sociology and human ecology.

## 1.3 The history

The history of human ecology has strong roots in geography and sociology departments of the late 19th century. In this context a major historical development or landmark that stimulated research into the ecological relations between humans and their urban environments was founded in George Perkins Marsh's book Man and Nature; or, physical geography as modified by human action, which was published in 1864. Marsh was interested in the active agency of human-nature interactions (an early precursor to urban ecology or human niche construction) in frequent reference to the economy of nature.

In 1894, an influential sociologist at the University of Chicago named Albion W. Small, collaborated with sociologist George E. Vincent and published a "‘‘laboratory guide’’ to studying people in their ‘‘every-day occupations. This was a guidebook that trained students of sociology how they could study society in a way that a natural historian would study birds. Their publication "explicitly included the relation of the social world to the material environment.

# 2 Behavioral Ecology

## 2.1 Animal behavior

Behavioral ecology, also spelled behavioural ecology, is the study of the evolutionary basis for animal behavior due to ecological pressures. Behavioral ecology emerged from ethology after Niko Tinbergen outlined four questions to address when studying animal behaviors that are the proximate causes, ontogeny, survival value, and phylogeny of behavior.

## 2.2 Adaptive significance

If an organism has a trait that provides a selective advantage (i.e., has adaptive significance) in its environment, then natural selection favors it. Adaptive significance refers to the expression of a trait that affects fitness, measured by an individual's reproductive success. Adaptive traits are those that produce more copies of the individual's genes in future generations. Maladaptive traits are those that leave fewer. For example, if a bird that can call more loudly attracts more mates, then a loud call is an adaptive trait for that species because a louder bird mates more frequently than less loud birds—thus sending more loud-calling genes into future generations.

Individuals are always in competition with others for limited resources, including food, territories, and mates. Conflict occurs between predators and prey, between rivals for mates, between siblings, mates, and even between parents and offspring.

## 2.3 Economic game theory

The value of a social behavior depends in part on the social behavior of an animal's neighbors. For example, the more likely a rival male is to back down from a threat, the more value a male gets out of making the threat. The more likely, however, that a rival will attack if threatened, the less useful it is to threaten other males. When a population exhibits a number of interacting social behaviors such as this, it can evolve a stable pattern of behaviors known as an evolutionarily stable strategy (or ESS).

This term, derived from economic game theory, became prominent after John Maynard Smith (1982) recognized the possible application of the concept of a Nash equilibrium to model the evolution of behavioral strategies.

# 3 Ecosystem Ecology

## 3.1 Biotic and abiotic

Ecosystem ecology is the integrated study of living (biotic) and non-living (abiotic) components of ecosystems and their interactions within an ecosystem framework. This science examines how ecosystems work and relates this to their components such as chemicals, bedrock, soil, plants, and animals.

## 3.2 Physical and biological

Ecosystem ecology examines physical and biological structures and examines how these ecosystem characteristics interact with each other. Ultimately, this helps us understand how to maintain high quality water and economically viable commodity production. A major focus of ecosystem ecology is on functional processes, ecological mechanisms that maintain the structure and services produced by ecosystems. These include primary productivity (production of biomass), decomposition, and trophic interactions.

## 3.3 Ecological mechanisms

Studies of ecosystem function have greatly improved human understanding of sustainable production of forage, fiber, fuel, and provision of water. Functional processes are mediated by regional-to-local level climate, disturbance, and management. Thus ecosystem ecology provides a powerful framework for identifying ecological mechanisms that interact with global environmental problems, especially global warming and degradation of surface water.

These characteristics also introduce practical problems into natural resource management. Who will manage which ecosystem? Will timber cutting in the forest degrade recreational fishing in the stream? These questions are difficult for land managers to address while the boundary between ecosystems remains unclear; even though decisions in one ecosystem will affect the other. We need better understanding of the interactions and interdependencies of these ecosystems and the processes that maintain them before we can begin to address these questions.

Ecosystem ecology is an inherently interdisciplinary field of study. An individual ecosystem is composed of populations of organisms, interacting within communities, and contributing to the cycling of nutrients and the flow of energy. The ecosystem is the principal unit of study in ecosystem ecology.

Complex Table (less accessible)

**Class Schedule**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LESSON | TOPIC | ASSINGMENT | Points | DUE |
| 1 | What is Distance Learning? | Wiki # 1 | 10 | March 10 |
|  |  | Presentation | 20 |  |
| 2 | History & Theories | Brief Paper | 20 | March 24 |
|  |  | Spring Break |  |  |
| 3 | Distance  Learners | Discussion #1 | 10 | April 7 |
|  |  | Group Project | 50 | April 14 |
| 4 | Media Selection | Blog #1 | 10 | April 21 |

# http://www.springboardmagazine.com/SpringImages/lifecycle_apple.gif 4 Ecological Economics

## 4.1 Human economies and natural ecosystems

Ecological economics (also called eco-economics, ecolonomy or bioeconomics of Georgescu-Roegen) is both a transdisciplinary and an interdisciplinary field of academic research addressing the interdependence and coevolution of human economies and natural ecosystems, both intertemporally and spatially. By treating the economy as a subsystem of Earth's larger ecosystem, and by emphasizing the preservation of natural capital, the field of ecological economics is differentiated from environmental economics, which is the mainstream economic analysis of the environment.

One survey of German economists found that ecological and environmental economics are different schools of economic thought, with ecological economists emphasizing strong sustainability and rejecting the proposition that natural capital can be substituted by human-made capital (see the section on Weak versus strong sustainability below).

## 4.2 Green economics

Ecological economics was founded in the 1980s as a modern discipline on the works of and interactions between various European and American academics (see the section on History and development below). The related field of green economics is, in general, a more politically applied form of the subject.

According to ecological economist Malte Faber, ecological economics is defined by its focus on nature, justice, and time. Issues of intergenerational equity, irreversibility of environmental change, uncertainty of long-term outcomes, and sustainable development guide ecological economic analysis and valuation.

## 4.3 Positional analysis

Ecological economists have questioned fundamental mainstream economic approaches such as cost-benefit analysis, and the separability of economic values from scientific research, contending that economics is unavoidably normative rather than positive (i.e. descriptive). Positional analysis, which attempts to incorporate time and justice issues, is proposed as an alternative.Ecological economics shares many of its perspectives with feminist economics, including the focus on sustainability, nature, justice and care values.

# 5 Theoretical Ecology

## 5.1 Theoretical methods

Theoretical ecology is the scientific discipline devoted to the study of ecological systems using theoretical methods such as simple conceptual models, mathematical models, computational simulations, and advanced data analysis. Effective models improve understanding of the natural world by revealing how the dynamics of species populations are often based on fundamental biological conditions and processes.

Further, the field aims to unify a diverse range of empirical observations by assuming that common, mechanistic processes generate observable phenomena across species and ecological environments. Based on biologically realistic assumptions, theoretical ecologists are able to uncover novel, non-intuitive insights about natural processes. Theoretical results are often verified by empirical and observational studies, revealing the power of theoretical methods in both predicting and understanding the noisy, diverse biological world.

## 5.2 Sciences

The field is broad and includes foundations in applied mathematics, computer science, biology, statistical physics, genetics, chemistry, evolution, and conservation biology. Theoretical ecology aims to explain a diverse range of phenomena in the life sciences, such as population growth and dynamics, fisheries, competition, evolutionary theory, epidemiology, animal behavior and group dynamics, food webs, ecosystems, spatial ecology, and the effects of climate change.

Theoretical ecology has further benefited from the advent of fast computing power, allowing the analysis and visualization of large-scale computational simulations of ecological phenomena. Importantly, these modern tools provide quantitative predictions about the effects of human induced environmental change on a diverse variety of ecological phenomena, such as: species invasions, climate change, the effect of fishing and hunting on food network stability, and the global carbon cycle.

## 5.3 Analytical techniques

Ecological systems are typically nonlinear, they often cannot be solved analytically and in order to obtain sensible results, nonlinear, stochastic and computational techniques must be used. One class of computational models that is becoming increasingly popular are the agent-based models. These models can simulate the actions and interactions of multiple, heterogeneous, organisms where more traditional, analytical techniques are inadequate. Applied theoretical ecology yields results which are used in the real world. For example, optimal harvesting theory draws on optimization techniques developed in economics, computer science and operations research, and is widely used in fisheries.

# 6 Η Οικογένειά μου

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